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(54) AV SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To centrally control a device added newly intensively without hindrance by allowing a central controller to provide an output of a command down-loaded from a device so as to control the device.

SOLUTION: A central controller 12 down-loads a command from an AV device 14 when control of the AV device 14 is required and overwrites the command to a command read/write memory. Furthermore, the controller 12 down-loads icon and GUI sources used for display for the user for its selection of processing from the AV device 14 storing the sources via a data transmission line 16. Thus, the controller 12 controls all AV devices 14 without storing commands of them in the memory and displays the icon and GUI relating to an AV device added newly even without storing the icon and GUI

sources relating to the AV device 14 added newly.

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2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] (a) The data transmission line which can connect, can detach the device for AV (14) freely suitably, and can set topology automatically, and is shared by transmission of AV data and control data (16), (b) The device for AV which contains the command for controlling the device itself and is connected to said data transmission line (16) (14), and (c) -- the command, while downloading a command from said device for AV (14) through said data transmission line (16) AV system characterized by having centralized-control equipment (12) which outputs to said device for AV (14) through said data transmission line (16), and controls said device for AV (14).

[Claim 2] Said data transmission line (16) is an AV system according to claim 1 characterized by being the data transmission line based on IEEE1394.

[Claim 3] Said centralized-control equipment (12) is an AV system according to claim 1 or 2 characterized by downloading a command from the device for AV

(14), and overwriting the memory for commands which can be written at the time of the need for control of said device for AV (14).

[Claim 4] Said device for AV (14) is an AV system according to claim 1 to 3 which contains the icon source and the GUI source and is characterized by said centralized-control equipment (12) downloading the icon source and the GUI source for using it for a display to a user in case a user chooses processing through said data transmission line (16) from the device for AV (14).

[Claim 5] AV system according to claim 1 to 4 characterized by having the wireless actuation machine (26) with which data are sent and received between said centralized-control equipment (12), and a user chooses processing.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to AV system which controls two or more devices for AV (audio video) by predetermined centralized-control equipment.

[0002]

[Description of the Prior Art] In AV system, when two or more devices for AV, such as a CD player, are connected to amplifier by AV cable, for example, it dubs the music of CD to a cassette tape, a user turns ON amplifier, a CD player, and a cassette tape recorder, and is operating the play switch of a CD player, and the sound recording switch of a cassette tape recorder. In this case, a user

needs to operate it in the place of each device for AV, and actuation becomes complicated.

[0003] on the other hand, amplifier -- a nucleus -- carrying out -- every -- while connecting the device for AV, and amplifier by AV cable, it ties in a control line and there is an AV system which can perform all actuation from the place of amplifier (centralized control) and which was made like.

[0004]

[Problem(s) to be Solved by the Invention] The trouble of the conventional centralized control of AV system is as follows.

(a) Centralized-control equipment needs to equip ROM with the control program of the device for AV beforehand, and cannot add the control program which has not equipped the control program later.

(b) Since centralized-control equipment will equip the control program of all the devices for AV of AV system, the amount of memory of the control program in centralized-control equipment increases.

[0005] The purpose of this invention is offering AV system which conquered the above-mentioned trouble.

[0006]

[Means for Solving the Problem] AV system (10) of this invention has following (a) - (c).

(a) Connect the device for AV (14) suitably. The device for AV (14) which contains the command for controlling the data-transmission-line (16) (b) device itself which can detach freely, and can set topology automatically and is shared by transmission of AV data and control data, and is connected to the data transmission line (16), and (c) data transmission line (16) are minded. the device for AV -- (centralized-control equipment (12 [0007] which outputs the command to the device for AV (14) through the data transmission line (16), and controls the device for AV (14) while downloading a command from 14)) AV data mean audio data and/or a video data. That is, only audio data may mean only a video data and AV data may mean both data.

[0008] Each device for AV (14) contains the command for controlling it, and to the data transmission line (16), suitably, it can connect and it can detach it freely. every by which the device for AV (14) connected to the data transmission line (16) is detected by automatic setting of topology, and centralized-control equipment (12) is connected to the data transmission line (16) -- while downloading the command of the device for AV (14) through the data

transmission line (16), the command is published to the device for AV (14) through the data transmission line (16), and the device for AV (14) can be controlled. Thus, even if centralized-control equipment (12) has not equipped beforehand the control program of the device for AV (14) newly added, it can carry out centralized control of the device for AV (14) added convenient. Moreover, the command of each device for AV (14) may be incompatible between the devices for AV (14).

[0009] According to other AV systems (10) of this invention, the data transmission line (16) is the data transmission line based on IEEE1394 further.

[0010] The data transmission line (16) based on IEEE1394 possesses all the conditions of being able to use in common to transmission of that can connect and the device for (a) AV (14) can be detached freely suitably, that (b) topology can be set automatically, (c) AV data, and control data.

[0011] According to other AV systems (10) of this invention, further, at the time of the need for control of the device for AV (14), centralized-control equipment (12) downloads a command from that device for AV (14), and overwrites the memory for commands which can be written.

[0012] Centralized-control equipment (12) needs to equip memory with no

command of the devices for AV (14) at once, whenever it is processing, it downloads the command of the device for AV in connection with the processing (14), overwrites memory, and can reduce the capacity of memory.

[0013] According to other AV systems (10) of this invention, further, the device for AV (14) contains the icon source and the GUI source, and centralized-control equipment (12) downloads the icon source and the GUI source for using it for a display to a user in case a user chooses processing through the data transmission line (16) from that device for AV (14).

[0014] GUI (graphical user interface) is desired when a user chooses processing in centralized-control equipment (12). Each device for AV (14) contains the icon source and the GUI source which are shown with the icon showing processings (example: in the case of a cassette tape recorder playback, a halt, a rapid traverse, etc.) of the device for AV (14) itself and its device for AV (14), a graphic form, etc., and the icon source and the GUI source download it to centralized-control equipment (12), and it is used for a display to a user in case a user chooses processing. Thereby, even if centralized-control equipment (12) has not equipped beforehand the icon source and the GUI source in connection with the device for AV (14) added newly, it can perform the display of the icon

and GUI in connection with the device for AV (14) convenient.

[0015] Other AV systems (10) of this invention have the wireless actuation machine (26) with which data are sent and received between centralized-control equipment (12), and a user chooses processing further.

[0016] A user can direct processing through a wireless actuation machine (26), without going out one by one to the place of centralized-control equipment (12).

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained with reference to a drawing. Drawing 1 is the block diagram of the AV system 10 a user instructs processing to be with a pointing device 22. Serial connection of the centralized-control machine 12 and two or more devices 14 for AV is made through the IEEE1394 bus 16. By IEEE1394 bus 16, since the number of a connection device is to a maximum of 63 and the centralized-control machine 12 takes the node number of one piece, the connection number of the device 14 for AV becomes a maximum of 62. A monitor 18 receives data from the centralized-control machine 12 through the usual cable 20. A pointing device 22 is operated by the user, is equivalent to the pointing device of a personal computer, has a manual operation button for

migration of the cursor of the screen of a monitor 18, a click, etc., and is connected to the centralized-control machine 12 by wireless. The actuation of a user in a pointing device 22 is sent to the centralized-control machine 12. The centralized-control machine 12 changes into an analog AV signal the data stream of AV signal inputted through the IEEE1394 bus 16, and the output of it is attained through the cable 24 at the loudspeaker with amplifier etc. When the loudspeaker has equipped the IEEE1394 interface, as a device 14 for AV, direct connection is made into the IEEE1394 bus 16, and the packet data of Av signal can be directly received from the centralized-control machine 12 or other devices 14 for AV.

[0018] Drawing 2 is the block diagram of the AV system 10 a user instructs processing to be with the wireless liquid crystal remote control 26. Only difference with drawing 1 is explained. The wireless liquid crystal remote control 26 is connected to the centralized-control machine 12 by wireless, and data are sent and received between the centralized-control machine 12 and the wireless liquid crystal remote control 26.

[0019] Drawing 3 is the block diagram of the wireless liquid crystal remote control 26. The data from the centralized-control machine 12 are inputted into

transmission and a receiver 28, and are displayed on a drop 32 through the depiction virtual unit 30. In the case of a touch panel, an input device 34 serves as an indicator 32, it is changed into a digital signal, and further, it is sent to A-D converter 36, and it is sent [the analog signal in connection with the touch part of a user's finger is sent to the input location converter 38, and transmission and a receiver 28, and] to the centralized-control machine 12 from transmission and a receiver 28.

[0020] Drawing 4 shows the relation between the virtual display rectangle 40 and the actual display screen 42 of a drop 32. The virtual display rectangle 40 has predetermined die length to the X-axis and Y shaft orientations, and the predetermined rectangle range of the virtual display rectangles 40 is actually displayed on a drop 32 as the display screen 42. The display screen 42 is actually freely movable within the limits of the virtual display rectangle 40.

[0021] Drawing 5 shows addressing of IEEE1394. The address is 64 bit length and 10 bits of the beginning have become a bus number and the space where, as for the following 6 bits, each node can use 48 bits of a node number and low order freely.

[0022] Drawing 6 shows the low order 48 bit-address space in each

centralized-control machine 12. This address space is recording the information concerning the icon of a sake in case each device 14 for AV chooses the processing which requires a user for that device 14 for AV, GUI, and a command. The address is expressed with 12 figures of hexadecimals, and each data is recorded on each address like drawing 6 . Since each device 14 for AV defines a command according to an individual, it does not need to have other devices 14 for AV and compatibility about a command.

[0023] Drawing 7 and drawing 8 are each partial diagrammatic view which divided the flow chart to the display in the wireless liquid crystal remote control 26, and actuation of a user up and down. In drawing 7 , pass initialization (S50) is automatically performed, when the power source of the centralized-control machine 12 and the device 14 for AV is turned on and a new node is added, and when a node is deleted, and topology is set automatically. Until it registers into the centralized-control machine 12 the icon of all the devices 14 for AV connected to the IEEE1394 bus 16 (S52) The source of an icon is led through the IEEE1394 bus 16 from each device 14 (node) for AV (= download). It is divided into icon source data and GUI source address data (S56), it registers with the icon table (drawing 10) of the centralized-control machine 12 (S58),

and the source data of an icon are sent to the wireless liquid crystal remote control 26 (S60). With the wireless liquid crystal remote control 26, an icon is plotted based on the sent source data of an icon (S62).

[0024] In drawing 8 , if a user corrects the location of the icon on the wireless liquid crystal remote control 26 by manual input (S66) (S64), based on the correction, the icon table (icon locations X and Y of the node of drawing 10) of the centralized-control machine 12 will be corrected (S68). Investigate in the demand of an icon, or the demand of GUI, and if the actuation input is the demand of GUI in S74 when the existence of the input from a user is investigated and a user inputs manually by S70 (S72), by S76 the input positional information of manual input to a GUI table (drawing 12) -- referring to -- a command -- publishing (a command being sent to the target device 14 for AV through the IEEE1394 bus 16) -- The following GUI source address is determined and the GUI source is led from the device 14 for AV (download). The downloaded GUI source is divided into GUI source data and GUI source address data, a GUI table is created and corrected by S80, the source data of GUI are transmitted to the wireless liquid crystal remote control 26 from the centralized-control machine 12 by S82, and GUI is plotted in the wireless liquid

crystal remote control 26 by S84 S78.

[0025] Drawing 9 shows the address of the icon table in the centralized-control machine 12. Drawing 10 shows the contents of each address of drawing 9 . Drawing 11 actually indicates the relation between the icon 44 on the display screen 42, and icon space to be each contents of drawing 10 . The address of the command corresponding to X coordinate in case the icon of each node 12, i.e., a centralized-control machine, and the device 14 for AV is arranged in the virtual display rectangle 40 of the wireless liquid crystal remote control 26 and Y coordinate, and an icon 44, and the storing address of the source of each icon 44 are recorded on the icon table.

[0026] Drawing 12 shows the contents of the GUI command table in the centralized-control machine 12. The GUI command table is recording the address of the X coordinate of each GUI command in a GUI screen, Y coordinate, and each GUI command. The command group of drawing 12 and the command group of drawing 13 have pointed out the same thing.

[0027] Drawing 13 shows the relation between an icon screen and a GUI screen, and data. This AV system 10 shifts to the GUI screen of the depths one by one until a command selection screen begins from an icon screen at first, chooses a

sub menu or a command on each GUI screen by choosing a command in a pop-up format and it reaches a command (it is the same as the select command method of Windows of a personal computer OS.). On an icon screen, while plotting the icon on an icon screen with reference to the icon source and a command from an icon table, it prepares for the command executed when an icon is chosen. Similarly, on a GUI screen, while plotting GUI on a GUI screen with reference to a command group (settlement of two or more commands) from a GUi icon table, it prepares for the command executed when a command menu is chosen.

[0028] Drawing 14 - drawing 21 are the division Figs. of the flow chart of the processing between both in the processing list in the centralized-control machine 12 and the wireless liquid crystal remote control 26. Left-hand side and right-hand side have been processing in the wireless liquid crystal remote control 26 and the centralized-control machine 12 to the boundary line 90, respectively. When initialized in drawing 14 (S92), the number of nodes connected from the topology map is investigated by S94, and it is the centralized-control machine 12 (in this flow chart) at S96. the centralized-control machine 12 -- AV It is referred to as Master. *icon address of each node number

and each node (* shall mean not the contents of memory but the address of memory) from -- each icon source and an icon command table (the icon command table is having illustration omitted in drawing 6) It leads (download) and it is memorized by S98 to the icon space (single-tier table on the right of drawing 11) of the centralized-control machine 12. In S100, the storage icon source of an icon table is sent to the wireless liquid crystal remote control 26.

[0029] In drawing 16 , in order to cope with manual input in the wireless liquid crystal remote control 26, based on the icon source from the centralized-control machine 12, processing which displays an icon on the drop 32 of the wireless liquid crystal remote control 26 is performed. By S116, a new icon is plotted, an icon plot location is suitably changed by the user and a final icon plot location is transmitted to the centralized-control machine 12 by S118 S120. If a user chooses a predetermined icon by S112, the input positional information X and Y will be transmitted to the centralized-control machine 12 by S124.

[0030] In drawing 15 , the icon locations X and Y of an icon table (drawing 10) are updated by S126 based on the icon plot location transmitted from the wireless liquid crystal remote controlS118 of 26. Moreover, in S128, the input positional information X and Y sent from the wireless liquid crystal remote

controlS124 of 26 is recorded in an actuation input register. The icon which whether the actuation input register of S128 was updated judged in S102, and the user chose by S104 based on the icon locations X and Y of an icon table (drawing 10) when updated, i.e., a node, (directions node.) = The device 14 for Directions AV judges either. If an output instruction is in the command of the command table of the directions node (S106), an instruction will be outputted to a directions node (S108), and if the command of the command table of the directions node has a GUI lead instruction (S110), it will progress to S130 of drawing 14 .

[0031] In drawing 17 , by S130, the next address (*GUI_1_GUI) of the icon source of drawing 6 and the ending address of an icon command (the icon command is omitted in drawing 6 .) is led from a directions node (download), and the magnitude (GUI_1_S_Length) of the GUI source of GUI (1) is got to know. At S132, it is *GUI_1_GUI++ (it means that + adds +1.). moreover, drawing 6 -- setting -- N N of Byt is set as 1. from -- GUI_1_S_Length length (1), i.e., GUI, is led (download). By S134, GUI (1) is transmitted to a drop 32. The GUI_C_Table value which asks for the sum of GUI_1_S_Length, *GUI_1_GUI, and 2, and expresses the command table length of address:*GUI_C_Table (1) equal to the

number, i.e., GUI, with S136 is led. In addition, in S146, a user's actuation input positional information transmitted to the centralized-control machine 12 from the wireless liquid crystal remote control 26 in S144 (it sets to drawing 18 and is the after-mentioned) is recorded in an actuation input register.

[0032] In drawing 18 , based on the GUI source of GUI (1) transmitted to the wireless liquid crystal remote control 26 from the centralized-control machine 12 in the above-mentioned S134, an icon screen is changed to a GUI screen and GUI (1) is described by S140 by manual input of a user in a drop 32. If a user performs a predetermined actuation input to the GUI screen of GU1 (1), the input positional information X and Y will be transmitted to the centralized-control machine 12 from the wireless liquid crystal remote control 26 by S144 S142.

[0033] Only the GUI_C_Table value led in S136 by S148 in drawing 19 is address:*GUI_C_Table++ (it means that + adds +1.). That is, close [of a GUI_C_Table value] is led from the next address of the address which was (download), and it is memorized by S150 to the GUI command table space (the command table of drawing 13 , and room of a command group) of the centralized-control machine 12. In S152, since it investigated whether it would be in agreement with the input location of a GUI command table in S154, the

actuation input register was cleared in S156 in the case of the inequality and the command was specified in coincidence noting that the actuation input register was updated, when new input positional information was recorded in the actuation input register in the above-mentioned S146, it progresses to S158 of drawing 20 .

[0034] In drawing 20 , the output instruction corresponding to the input specified by the user is carried out by S158. This instruction is outputted to the node 14 in connection with this, i.e., the device for AV, through the IEEE1394 bus 16. If it judges whether it is necessary to display the next GUI screen by S160 and there is need, by S162, the address of the following GUI source is calculated based on the offset value from GUI_C_Table and *GUI_C_Table described by the GUI command table (drawing 12), and the GUI source of the address is led (download). In S164, the led GUI source is transmitted to the wireless liquid crystal remote control 26, and a GUI command table is led in S166 (download).

[0035] In drawing 21 , the GUI command table led by S166 is memorized to the GUI command table space of the centralized-control machine 12 by S168. If S170 and S172 are directions which process like the above-mentioned S152 and S154, and will return to return and the first icon screen S158 if in agreement,

they will return to S100.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is AV structure-of-a-system Fig. where a user directs processing

with a pointing device.

[Drawing 2] It is AV structure-of-a-system Fig. where a user directs processing with wireless liquid crystal remote control.

[Drawing 3] It is the block diagram of wireless liquid crystal remote control.

[Drawing 4] It is drawing showing the relation between a virtual display rectangle and the actual display screen of a drop.

[Drawing 5] It is drawing showing addressing of IEEE1394.

[Drawing 6] It is drawing showing the low order 48 bit-address space in each centralized-control machine.

[Drawing 7] It is the up part Fig. which divided the flow chart to the display in wireless liquid crystal remote control, and actuation of a user up and down.

[Drawing 8] It is the lower part Fig. which divided the flow chart to the display in wireless liquid crystal remote control, and actuation of a user up and down.

[Drawing 9] It is drawing showing the address of the icon table in a centralized-control machine.

[Drawing 10] It is drawing showing the contents of each address of drawing 9 .

[Drawing 11] It is drawing actually showing the relation between the icon on the display screen, and icon space with each contents of drawing 10 .

[Drawing 12] It is drawing showing the contents of the GUI command table in a centralized-control machine.

[Drawing 13] It is drawing showing the relation between an icon screen and a GUI screen, and data.

[Drawing 14] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 15] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 16] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 17] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 18] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine

and wireless liquid crystal remote control.

[Drawing 19] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 20] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Drawing 21] It is the partial diagrammatic view which divided the flow chart of processing between both into the processing list in a centralized-control machine and wireless liquid crystal remote control.

[Description of Notations]

10 AV System

12 Centralized-Control Machine

14 Device for AV

16 IEEE1394 Bus (Data Transmission Line)

26 Wireless Liquid Crystal Remote Control (Wireless Actuation Machine)